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COMMONWEALTH PHYTOPATHOLOGICAL NEWS

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MAIN ITEMS

DEVELOPMENT OF LOW VOLUME SPRAYING

CEREAL VIRUSES IN BRITAIN

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FROM NEAR AND FAR

OVERSEAS NEWS

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BOOK MART

SPRAY TECHNIQUES: THE DEVELOPMENT OF LOW VOLUME SPRAYING

by J. H. Stapley, B.Sc., A.R.C.S.
Plant Protection Ltd., Fernhurst Research Station

Introduction

Low volume, or concentrate, spraying is a new and valuable technique which has many advantages to offer over the old conventional method of dilute, or high volume, spraying. Probably there have been three principal contributing factors to its development:

(1) The use of air in liquid spraying.

(2) The advent of aircraft application.

(3) The principle of using small volumes of liquid in the application of hormone weedkillers.

One of the earliest spraying machines employing air blast was the 'Agro' sprayer designed for applying copper sprays to potatoes to prevent potato blight. In this machine high speed air produced by means of a precision fan was conducted to all parts of a long boom and used to scatter a slowly moving stream of liquid into spray droplets. (The main purpose of the air was to break up the spray into drops.) The air could hardly be said to contribute a great deal to the carrying power of the spray.

The 'Agro' sprayer could be used for low volume spraying (in 50 gallons of water per acre) but with the introduction of hormone weedkillers a less expensive machine was required. To meet this demand the Plantector type of low volume sprayer was developed. In this the spray liquid is pumped at low pressures of only 30 lb. per sq. in, the break-up of the spray being achieved by forcing the liquid through very fine jets. These machines quickly found favour as they were cheap and easy

to construct.

Ground Crop Spraying

Farmers soon began to ask if the Plantector could be used for applying insecticides and fungicides. In due course information began to accumulate, but at the same time an important principle was established — that the amount of insecticide or fungicide must be maintained on an acreage basis. In other words it is immaterial in what volume of water an insecticide or fungicide is applied provided that the amount of chemical per acre stays the same.

For example 1 lb of DDT per acre has been found to give good control of such pests as flea beetle on seedling brassicae, pea and bean weevil on seedling peas, and carrot fly on carrots. 1 lb DDT may be represented in manufactured form by $3\frac{1}{5}$ pints of 25 per cent. DDT Miscible Liquid. This $3\frac{1}{5}$ pints of product can be applied equally well as high volume in 100 gallons water per acre or low volume in 20 gallons per acre.

In general it can be said that low growing crops such as seedlings, sugar beet, and carrots can be sprayed easily by boom sprayer. Taller crops are more difficult to spray but pests living exposed upon them, such as Colorado beetle on potatoes, can be treated in this way.

Dense crops or tall crops affording some shelter to the pest, for example, peas when they have reached the flower stage, cannot be so readily sprayed.

Hops

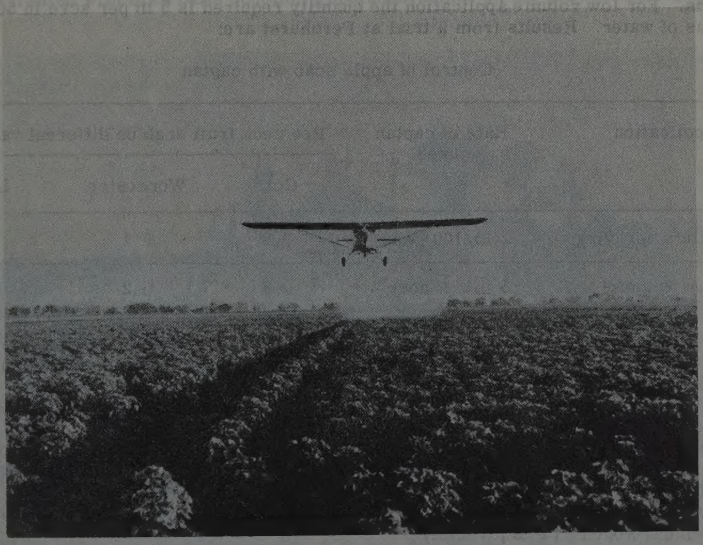
From spraying downwards with a boom sprayer for treating ground crops such as seedling brassicae and sugar beet, the next step was to spray upwards against gravity. Probably hops were the first tall crop in Great Britain on which low volume spraying was used successfully. Hops are grown in rows with alleys between and are normally sprayed by hydraulic sprayers at 100 to 200 gallons per acre, a very easy and straightforward undertaking. The first attempt to spray hops with low volume at 20 gallons per acre was actually made with a Plantector type machine with the booms mounted vertically. The drawback to this was that the height of the machine was limited by the stringing of the hops. It was obvious that air blast would be necessary to carry the spray upward to the top of the wirework, 14 feet high. As soon as air was used hop spraying at low volumes of 25 gallons per acre became a practical proposition. The first low volume hop sprayer was made in 1950 by converting the 'Agro' sprayer to use air to carry the spray, which was first broken up by a series of small Bray jets.

When spraying hops it was further demonstrated that the volume of wash was immaterial, but if the rate of insecticide per acre was too low it would be ineffective. The maximum volume of wash which an acre of hops will support is 250 gallons. Beyond this gallonage the wash was wasted by run off. It is unlikely, therefore, that more than $12\frac{1}{2}$ fl. oz. of parathion would be required per acre. In the trial above 5 fl. oz. per acre proved satisfactory but below this it was ineffective.

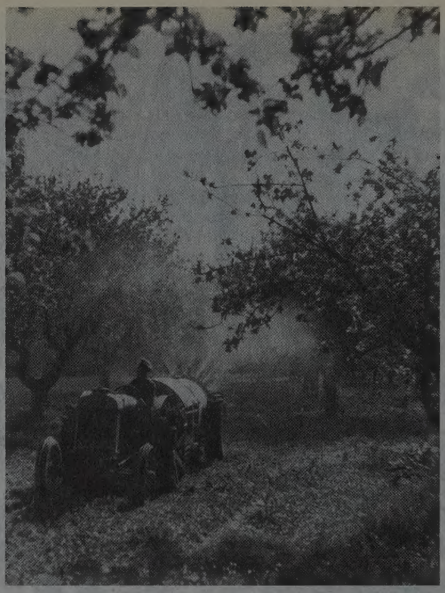
Fruit Tree Spraying

From spraying hops it was but a short step to spray established fruit. Air-blast machines were already in use in the United States and in Great Britain applying very high volumes of diluted wash, up to 1,000 gallons per acre being used in the United States and 250 to 400 commonly in Great Britain. Probably the most widely used fruit sprayer in this country was the 'Autoblast', the registered trade name of K.E.F. It was a simple matter to convert this to spray at low volumes by fitting it with small Bray jets. Using sixteen No. 4 Bray jets it was possible to reduce the spray to 50 gallons per acre at normal tractor speeds. Trials at 50 gallons of wash per acre were first undertaken in 1951 while parallel developments took place in the United States. By 1954 about 2,000 acres of fruit were being sprayed in Great Britain at the 50-gallon rate with considerable saving in time and labour.

Acreage rates for all common insecticides and fungicides were established and it was shown that control of apple pests and diseases at least equal to that by the best possible of dilute washes could be achieved at 50 gallons per acre.



Above — A motorized knapsack mist-blower with polythene tank spraying cacao in West Africa.
Below — Spraying cotton against jassids with DDT Emulsion.



K. E. F. Autoblast spraying apples against scab

The amounts of insecticide and fungicide required are approximately two and a half times that normally used per 100 gallons of dilute wash. For example, the fungicide captan for control of apple scab is used at the rate of 2 lb per 100 gallons. For low volume application the quantity required is 5 lb per acre in 50 gallons of water. Results from a trial at Fernhurst are:

Control of apple scab with captan

Application	Rate of captan used	Per cent. fruit scab on different varieties		
		Cox	Worcester	Laxton
Dilute spraying	2 lb/100 gals.	0·9	0·1	0·3
Low volume	5 lb / acre	0·9	0·2	0·2

The increasing popularity of low volume, or concentrate spraying soon led to the production of new machines. Those operated by the power take-off from the tractor were particularly suitable and combined accuracy with efficiency.

The Dutch had meantime used a technique of mist-blowing on fruit. This enabled the trees to be sprayed at rates down to 10 to 15 gallons per acre but the machines required two men, one to drive the tractor and one to direct the spray. In these machines air is used both to carry the spray on to the tree, and to break it up into small droplets by a shearing action. The technique makes use of high velocity air which is directed into the trees as a long column or plume. Several machines have been developed on this principle.

Mistblowers

Probably the most important application of the mist-blowing technique is for

spraying tropical crops such as cocoa, coffee, and bananas. The development of portable, shoulder-mounted mist-blowers made the application of insecticides to crops such as established cocoa possible for the first time. Such crops, growing in the forest to a height of 20 to 25 feet, are quite unapproachable by wheeled vehicles of all kinds. The treatment of cacao in Nigeria with a fungicide containing copper for control of black pod is a notable example of this technique. The spray is applied at about 5 gallons per acre, which would appear to be the optimum for manual operation in tall crops. The shoulder-mounted machines have a tank capacity of 2 gallons, and one machine can spray about 10 acres per day.

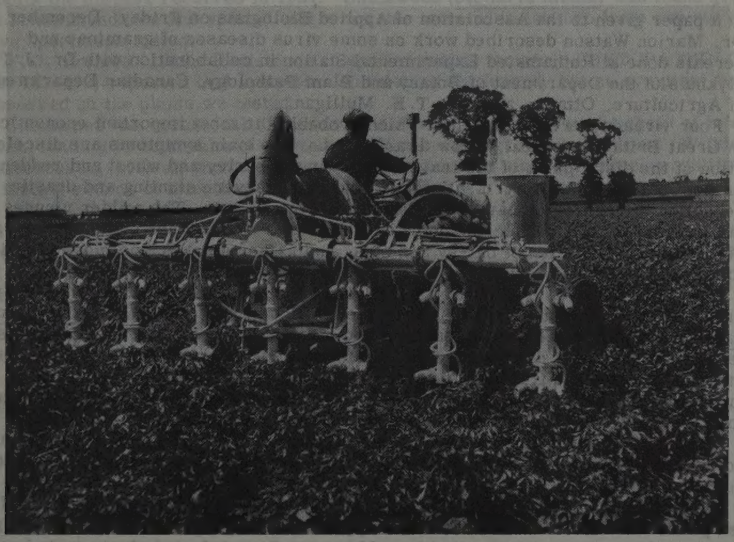
Aircraft

Parallel with the development of small portable mist-blowers is the opposite extreme of application by aircraft. For reasons of economy it is desirable to treat the largest acreage possible with a single load, so the first job was to find the smallest volume required to treat an acre efficiently. Considerable work in the Sudan with the aircraft application of DDT to cotton for the control of jassid has shown that volumes as low as $\frac{1}{2}$ gallon per acre will give an effective coverage. Biologically, it was demonstrated that 2 gallons per acre was preferable to 1 gallon, and 1 gallon to 0·4 gallons for achieving knockdown of jassids.

Even very low rates of insecticide, as low as $\frac{1}{10}$ lb of DDT, have given kills of jassids comparable to higher rates. Good results, however, have been achieved at $\frac{1}{2}$ lb of DDT and over, which conferred persistence at this dose. The optimum gallonage appeared to be about 2 to 3 gallons per acre.

It must be appreciated that aircraft spraying has many limitations. Application can be made on relatively low growing crops against pests readily susceptible to insecticides, such as jassids and thrips. Treatment of dense crops such as cotton, when fully grown, or tree crops, such as fruit, is not particularly successful by aircraft. Likewise, no control of difficult pests like white fly or bollworm has been demonstrated by aircraft, but considerable success has been achieved in the Caribbean by the use of oil-based sprays from helicopter and motorised knapsacks against Mycosphaerella leaf spot of bananas at a rate as low as 2 gal. per acre.

Reference must be made to aerial spraying against locusts. Formerly, they were treated with bran baits containing sodium arsenite on the ground against the



An Agro sprayer on a potato field in Kent

hoppers. Aircraft spraying has made the treatment of flying swarms possible. Liquid insecticides containing gamma-BHC, have been applied successfully at ½ to 1 gallon per acre. Undiluted, such a dose may account for 750,000 locusts.

Formulations of spray chemical

The advent of low volume spraying techniques has brought about considerable changes in the formulation of spray chemicals. The vast majority of these chemicals are insoluble in water and must be suitably formulated for dispersion in this medium before they can be used in the field.

The cheapest and most convenient method is to prepare dispersible powders. These are made by grinding the chemical to a powder and adding suitable dispersing agents. This inevitably results in a proportion of the particles being relatively coarse and so some of the very fine spray droplets produced in low volume spraying may not contain their fair share of active ingredient.

For low volume spraying better results are likely to be obtained if the chemical is made as a true solution or as a dispersion of very fine particles of almost molecular size. These very fine particles have the further advantage that they are less likely to block the small nozzles used for low volume work – a trouble which often occurs when dispersible powders are used. From this point of view lime-sulphur is ideal as it is a true solution in water and merely requires further dilution with water in the spray tank to be ready for use. Water-miscible liquids and emulsions are the next best choice. Here the active chemical is dissolved in a suitable organic solvent, and this solution is dispersed in water in the case of miscible liquids, or emulsified with the water in the case of emulsion. In the miscible liquid type of formulation the active ingredient is usually forced out of solution and is suspended as fine solid particles in the spray liquid. In an emulsion the active chemical remains dissolved in the organic solvent, which in turn is suspended or emulsified as very small droplets in the water.

It will thus be seen that both these types of formulation provide a much finer admixture with water than is possible with dispersible powders, hence their special suitability for low volume work.

VIRUS DISEASES OF CEREALS IN GREAT BRITAIN

In a paper given to the Association of Applied Biologists on Friday, December 6, Dr. Marion Watson described work on some virus diseases of graminae and cereals done at Rothamsted Experimental Station in collaboration with Dr. J. T. Slykhuis of the Department of Botany and Plant Pathology, Canadian Department of Agriculture, Ottawa, and Mr. T.E. Mulligan.

Four viruses were described of which probably the most important economically in Great Britain is cereal yellow dwarf virus. The main symptoms are discolouration of the distal parts of the leaves; yellowing in barley and wheat and reddening in most oat varieties. Virulent strains that cause severe stunting and drastic reduction of grain yield have been described from U.S.A. The milder viruses so far isolated from British crops have caused losses up to 30 per cent. of the grain yield in some varieties of barley and oats, and rather smaller and more erratic losses in wheat.

The virus has been transmitted by all the species of aphid that have been found breeding on cereals and grasses. The most efficient vector was Rhopalosiphum padi, which alternately colonises plum and graminaceous hosts. R. padi needs to feed for more than a day on infected wheat and more than a day on healthy wheat in order to acquire and transmit the virus efficiently, but it retains the ability to infect for many days, so the behaviour of the virus in the field should be similar to that of leaf roll of potatoes and yellows virus of sugar beet.

It infects a number of meadow and weed grasses, which probably act as reservoirs of infection. It is not transmitted by sap-inoculation, or through the seed, so far as is known.

Rye grass mosaic was found causing damage to seed crops of rye grass. Infected plants are stunted with narrow, whispy leaves bearing a chlorotic or necrotic mottle. The virus is transmitted by rubbing sap from infected plants on to healthy seedlings in the presence of an abrasive, and also by a species of Eriophid mite;

the vector has not yet been specifically identified.

Barley false stripe virus was found in an imported barley variety, Gloire de Velay, among some breeding material at the National Institute of Agricultural Botany, Cambridge. So far it has not been found elsewhere. It is of great importance to breeders because it is transmitted through the seed and through the pollen of infected plants to a very large proportion of the progeny. No insect vector is known for it, but it is transmitted by sap inoculation, as its particles are reasonably stable and in high concentration in infected sap. It can infect members of the Chenopodiacae as well as Gramineae.

Wheat striate mosaic causes a severe, chlorotic, and stunting disease of cereals. In its later stages it could be mistaken for genetical variegation. The name is derived from the first symptoms to appear, which take the form of fine, broken white lines, or striae, on leaves developed after inoculation. In symptoms, and in being hopper-transmitted, the disease closely resembles American wheat striate mosaic described by Slykhuis, and it was therefore given the same name although the vector, Delphacoides pellucida, is different.

This is only the second hopper-transmitted disease to be described from Great Britain, and at present it seems to present no economic problem, for it spreads only slowly in the field, and few plants are usually found to be infected in any crop. However, the vectors readily become infective after from 1 to 3 days feeding on infected plants. They retain the ability to infect for most of their lives, which may be months, and can pass on the virus through the egg to a high proportion of their progeny, so the potentialities for build-up in the right conditions seem to be very great.

It is, in fact difficult to understand why the disease is not more serious in this country. It can only be supposed that the vectors are not usually very numerous on wheat, and that the virus is not very readily available to the hoppers in their grass hosts, which include Lolium perenne and L. multiflorum Lam.

TOMATO SPOTTED WILT INFECTION FROM CHICKWEED

In a group of glasshouses in Aberdeenshire spotted wilt has been the cause of much loss among tomatoes during the past three years. Despite the grower's attempt to exclude infection by removing from the glasshouses all likely alternative host plants the disease recurred in 1957. Chickweed (Stellaria media) was found growing in some abundance and spotted wilt virus was isolated in tobacco from two out of five specimens tested.

F.O. Holmes (1948. Resistance to spotted wilt in tomato. PHYTOPATHOLOGY, 38: 467-473) reported leaf symptoms on infected chickweed, but no symptom was observed on the plants we tested.

Chickweed has occasionally been noted elsewhere as a link in the chain of infected hosts leading to outbreaks of spotted wilt in tomatoes grown in the open. Within glasshouses, even an unobtrusive growth of chickweed may sometimes constitute a lasting source of infection.

E.G. Gray,
North of Scotland College
of Agriculture,
Aberdeen.

J.M. Todd,
Department of Agriculture
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P E R S O N A L N E W S

C.M.I. News

The Director has recently visited agricultural research stations in Uganda, Kenya, and Tanganyika at the invitation of the Colonial Office. He was able to inspect the work in progress and to discuss plant pathological matters with members of the staff of the East African Agricultural and Forest Research Organization, Muguga, the Department of Agriculture, Nairobi, the wheat breeding station at Njoro, the coffee research stations at Jacaranda and Lyamungu, the Colonial Pest Research Unit, Arusha, the experimental stations of Bukalasa and Kawanda and the Empire Cotton Growing Corporation station at Namulonge.

During the tour he also attended a meeting of the East African Agricultural Research Council as a representative of the Secretary of State for the Colonies and spent nearly a week in Zanzibar on a survey of withertip disease of limes (see p. 12).

Commonwealth Institute of Entomology

E.O. Pearson, assistant director, has been appointed director designate to follow Dr. W.J. Hall, who will retire in 1958.

Appointments, Promotions, Retirements, etc.

The Overseas Service Division of the Colonial Office announce the following appointments: A. de K. Frampton, deputy director of agriculture, Barbados; V.E. Gale, assistant director of agriculture, Western Nigeria; G. Gamble, assistant director of agriculture (field), Kenya; C.E. Johnson, deputy director of agriculture, Northern Rhodesia; B.H. Kenton, biochemist, W.A.C.R.I., Ghana; D.G. Thomas, senior botanist, Uganda.

Mr. T. Swaminathan (India) has been elected chairman of the Executive Council of the Commonwealth Agricultural Bureaux and Dr. J.G. Malloch (Canada) vice-chairman.

Prof. J.B.S. Haldane has been elected emeritus professor of biometry in the University of London.

Dr. M.F. Madelin is rejoining the staff of the Imperial College of Science and Technology, London, and is arranging a course on fungus physiology.

Miss E.M. Turner has been appointed lecturer in botany at St. Anne's College, Cambridge.

Dr. H.G. Thornton, F.R.S., head of the soil microbiology department at Rothamsted is retiring soon. He will be succeeded by Dr. P.S. Nutman, who was seconded to the division of plant industry, C.S.I.R.O. Australia from 1953-56.

Old Manchester University students will be interested to learn that E. Ashby, chief steward in the cryptogamic laboratory, has retired after 47 years service.

Dr. R.K.S. Wood, reader in plant pathology at Imperial College of Science and Technology, London, is spending a year's sabbatical leave with Drs. J.C. Horsfall and A.E. Dimond at the Agricultural Experimental Station, New Haven, Connecticut.

Dr. W.J. Dowson of the Botany Department, Cambridge, visited the West Indies in November to attend a meeting of the B.W.I. Sugar Technologists and read a paper on bacterial diseases of sugarcane.

C. Logan, who is investigating the Abyan root rot of cotton at Aden for the Empire Cotton Growing Corporation is now on leave in Scotland.

Royal Society of South Africa

Dr. R.H. Marloth, director of the Citrus and Sub-tropical Horticultural Research

(continued on p. 15)

O V E R S E A S N E W S

NOTES FROM CANADA

New Research Laboratory

The New Canada Department of Agriculture Research Laboratory was opened in the summer of 1957. Chief of the laboratory and head of Plant Pathology is Dr. T. Johnson; other section heads are Dr. R.F. Peterson, Cereal Breeding, and Dr. R.D. Bird, Entomology.

NEW ZEALAND NOTES

Phytophthora Root Rot of Pinus radiata: In the spring of 1953 and 1956 following exceptionally heavy rainfall there were many spectacular cases of mortality in 30 to 40-year-old Pinus radiata trees growing in farm shelter belts in the North Auckland district. Groups of trees which had appeared to be growing normally wilted rapidly and died, while adjacent trees and trees in other hedgerows deteriorated slowly and died with symptoms not unlike those of little leaf disease of P. echinata and P. taeda in South Eastern U.S.A. (Campbell, Copeland, 1954, and others). As in the case of the latter disease Phytophthora cinnamomi was very commonly isolated from the soil surrounding dead lateral rootlets on otherwise healthy main roots. Results of these investigations have been briefly reported in the THIRTIETH ANNUAL REPORT OF THE DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH (N.Z.), 1956. P. cactorum and to a lesser extent P. megasperma were also found to be associated with the disease in some areas.

A modification of Tucker's isolation technique of injecting soil into apples was used. It was found that a prior steep of 36 to 48 hours in water increased the recovery rate of P. cinnamomi from soil samples by up to 100 per cent., particularly with summer dry soils. Presumably this soaking stimulated germination of oospores and assisted in increasing the relative density of Phytophthora mycelium in the soil. (Dilution tests with mycelial suspensions and non-sterile soil showed that there was a minimum mycelial density below which the fungus could not be recovered by injection into an apple.)

Pathogenicity to rootlets has been demonstrated for P. cinnamomi and P. cactorum in a series of tests with seedling Pinus radiata. As with little leaf disease in the U.S.A. it is assumed that P. cinnamomi is a major factor in causing symptoms on mature pines. Affected shelter belts have without exception yielded

either P. cinnamomi or P. cactorum, or both, from a large number of soil samples. Healthy shelter belts were often found to be free, or virtually free, from these fungi; some of those yielding a high proportion of positive samples developed severe disease symptoms later. Sampling on a grid pattern from the base of affected trees to well out in the open field has shown that P. cinnamomi and P. cactorum are present in a high proportion of samples within the first 6 to 10 feet from the trunks, i.e. in the feeding root zone, but are either absent or present in occasional isolated samples beyond the root zone. There is evidence that susceptibility is governed by age and poor subsoil drainage.

Three commercial plantations in the North Island have yielded high proportions of samples infected with P. cinnamomi.

Plant Diseases Division, F.J. Newhook
D.S.I.R., Auckland.

NEWS FROM NEW SOUTH WALES

The Effect of Oil in Controlling Banana Leaf Spot: There is little doubt that one of the most interesting and possibly also one of the most important developments in plant disease control in recent years has been the demonstration by Cuillé and Guyot and later by others of the value of oil in controlling leaf spot of bananas. There is special interest in the observation that oil applied without fungicides also exercises control of this disease. The writer considers, however, that we should hesitate in referring at this stage to the effect of the oil as "fungistatic" or "eradicant" as was done in the West Indian Notes in the July issue of C.P. NEWS. It is thought that it is more likely that the oil has a conditioning effect in retarding senescence of banana leaves. Cuillé and Guyot seem to have held this view, stating "it may be that there is no true fungicidal or fungistatic action but merely an inhibition of development owing to the physical changes which occur in the leaf surface."

The determination of the nature of the effect of the oil might lead to further important results. We in New South Wales are now wondering whether in other cases of latent infections the addition of a mild mineral oil to the fungicide might have advantages. Dr. T.B. Kiely, from 1940 onwards, developed a spray programme, incorporating white oil, for the control of black spot of citrus (Guignardia citricarpa). In this disease the pathogen may remain latent for almost a year and Kiely (SCIENCE BULLETIN No. 71, New South Wales Department of Agriculture) was convinced that the beneficial effect of the oil was related to the physiology of fruit ripening. He found that the application of white oil alone did not result in much control of the disease but it slowed down fruit maturity. When used as an additive to Bordeaux mixture it greatly improved control.

White oil is also included in the N.S.W. programme for control of Septoria spot of citrus (S. depressa), another disease in which there is a prolonged latent period. Here again it is now considered that the oil has a conditioning effect on the rind of the fruit or on the tree rather than a wetting or spreading action on the spray, which was the original reason for its incorporation in the spray mixture.

Root Rot of Golden Tares (Vicia sativa): The sod-seeding of this crop has become popular as a means of providing winter feed on the north coast of New South Wales and an extensive root rot occurred during the autumn of 1957 in one area. The disease has been shown by Dr. P.G. Valder to be caused by a species of Cylindrocladium, with a perfect stage in Calonectria.

The local isolate has been shown to be able to attack red, white, and subterranean clovers, lucerne, peas, and cowpeas in glasshouse tests, but its identity has not yet been established. It is similar to C. scoparium which has a world-wide distribution and has been observed previously in Australia on strawberries and roses. Attention has recently been drawn to the similarity of the disease symptoms and the morphological characteristics of C. scoparium and Rhizoctonia solani, with which it may at times have been confused, and a closer watch will be kept in future on root rots of this type.

Bean Breeding for Disease Resistance: In co-operation with Emeritus Professor

W. L. Waterhouse of Lindfield, a programme of bean breeding and testing for disease resistance is being carried out by Mr. J. Walker. The main diseases concerned in this work are anthracnose (Colletotrichum lindemuthianum) and rust (Uromyces phaseoli typica) but parents with some resistance to halo blight (Pseudomonas medicaginis v. phaseolicola) are being included this season. The aim of the work is to produce a commercial dwarf bean resistant to the above diseases. The main resistant parents being used are Westralia (Phaseolus vulgaris), a climbing bean resistant to rust and anthracnose, and Scarlet Runner (P. coccineus), also resistant to the two fungous diseases. Several other varieties and species of Phaseolus are being incorporated in the breeding programme. Several cross-bred lines showing resistance to anthracnose and rust are already in their fifth generation.

C. J. Magee

NEWS FROM INDIA

The Third Biennial All India Sugarcane Research and Development Workers Conference was held this year at Pusa, Bihar, from 25 to 31 October, 1957. Dr. B. L. Chona, of the Indian Agricultural Research Institute, presided over the deliberations of the Plant Pathology Section of the Conference. Sixteen papers on sugarcane diseases dealing with red rot, smut, red stripe, rust, grassy shoot, and chlorotic disease were read and discussed.

In his Presidential address, Dr. Chona briefly traced the history of red rot epidemics in India and discussed the various facets of this problem. The necessity to investigate as to how new strains arise in nature, how they spread over large areas quickly, how they can be detected, and what are the factors that make a strain virulent or a variety susceptible was stressed.

A new chlorotic disease (or albinism) was reported to have appeared in a severe form in certain areas in Western Uttar Pradesh, Jaypore Sugar Mills, Orissa; Mandya Sugar Factory, Mysore and Andhra. It was felt by various workers who have carried out some preliminary work on it that the disease may be of virus origin.

Rust of sugarcane, which was reported to have appeared in Bombay-Deccan area on Co. 419 in 1950 for the first time, continues to be of concern to cane growers. The differential attack of this disease on cane varieties as observed at Padegaon suggests the possibility of physiologic races. Lately, in some preliminary experiments at the Indian Agricultural Research Institute, a rust of Saccharum spontaneum successfully infected sugarcane. The taxonomy of sugarcane rust as well as those occurring on wild Saccharum species requires to be worked out.

A new phanerogamic parasite, namely Scopubia delphenifolia, was reported on sugarcane in India for the first time.

Grassy shoot disease of sugarcane, reported earlier, has been successfully transmitted at the Indian Agricultural Research Institute, through the agency of Longiunguis sacchari. Hot water treatment of setts at 52°C. for 2 hours failed to control the disease.

Red leaf sheath of sugarcane was reported to cause extensive damage to the chief commercial variety Co. 419 on certain plots of the estate of one sugar factory in the Deccan during 1954-55 and has been attributed to a strain of Sclerotium rolfsii Sacc. The disease is, however, localised in that particular area.

R. S. Vasudeva

Forest Pathology Notes

Wilt of Shisham: Attention is drawn to a serious wilt disease of shisham (Dalbergia sissoo) caused by Fusarium solani found both in plantations and natural forests of the Uttar Pradesh State. The parasite attacks mostly trees of advanced growth; rarely seedlings and saplings. The affected plants are killed usually within 1 to 3 months after initial symptoms of the disease are observed in the aerial parts. The disease has been successfully reproduced by inoculation experiments on trees, and has also been induced on seedlings in liquid culture by growing them on culture fil-

trate of the pathogen (filtered through a G 5 sintered glass funnel or dialysers).

In sandy or loamy sand soils shisham grows free from any disease. The incidence of root diseases becomes greater with decreasing sand and a corresponding increase in silt and clay in the soil (INDIAN FORESTER, 83,555-558, 1957). Soil texture should therefore determine whether a site is suitable for raising plantations of the species. Laboratory experiments together with circumstantial evidence in the field suggest that the high incidence of the disease in plantations can be controlled by occasional irrigation and good drainage (INDIAN FORESTER, 83, 505-511, 1957).

Forest Research Institute, B.K. Bakshi
Dehra Dun.

'POOL' NEWS

At the request of the Colonial Office the Director extended his recent tour of Uganda, Kenya, and Tanganyika to spend the best part of a week in Zanzibar to make an appraisement of the position regarding withertip of limes, which is causing the bulk of the crop to be shed, thus precluding the expansion of the lime juice and oil industry.

Little research has been done on this disease in recent years, and that has been somewhat complicated by the uncertainties regarding the status of tristeza or other viruses.

Dr. Hopkins has now recommended that the Pool should undertake an investigation for an initial period of two years and preparations are being made for Dr. Wheeler, who has completed his reconnaissance survey of plant diseases in Malta, to go out before the end of February, 1958.

Paul Holliday is now in England on leave from the pepper foot rot project in Sarawak. He will return for another tour about the middle of 1958.

A VISIT TO SOUTH AFRICA

by Grace M. Waterhouse

While on a holiday tour of South Africa recently I was able to include visits to one or two research stations and departments of botany. At Johannesburg I spent a day at the Chamber of Mines Timber Research Laboratory through the courtesy of the Director of the Department, Dr. James. The mycologist, Dr. Neethling, has some very interesting work in hand -- apart from routine identifications. She has evolved a new, rapid, turbidemetric method of measuring increase in colony growth with temperature; this has enabled her to suggest temperature control for three hyphomycetes causing clogging of large, cylindrical, canvas filters. She also has a new slide technique for observing microscopically the stages of fungal attack on individual textile fibres; some fine photographs showed the successive deterioration of a wool fibre by Stachybotrys atra. In the same department others are working on the chemistry of wood-destroying fungal enzymes and on the use of sonic vibrations for testing timber strength in relation to decay.

At Stellenbosch I visited the Van der Byl Plant Pathology Research Laboratory by the kind permission of Professor Louw. Here, Dr. Van der Want is investigating the damage to wheat by Corticium solani, which apparently predisposes the plant to take-all (Ophiobolus graminis). He finds the take-all problem is quite different from that in England; carry-over is not in susceptible grasses and re-infection is related to the culture of lupins, the normal rotation crop, which are severely at attacked by C. solani. Other work in progress is on the detection of cereal rust races and on cucurbit viruses. I looked in on the new building for General Microbiology of the Western Province Fruit Research Station, but as the staff had only just settled in I was not able to see any work in progress; Dr. Englebrecht, recently returned from England, gave me an outline of the problems ahead, the most important being fruit viruses.

(To be continued)

FROM NEAR AND FAR

It is the custom of Great Harwood Urban District Council to erect illuminated Christmas trees in the town to enliven the Festive Season by providing, among other things, a meeting place for carol singers. This year no suitable trees have so far been found, the usual supply having been defoliated by a disease attributed by the clerk to the Council to - "possibly Asian 'flu". Despite this set-back the Council are persevering, and no doubt plant pathologists would be interested to hear of any control measure devised to obviate a repetition of the calamity.

Forthcoming Conferences

The 9th International Botanical Congress will be held at McGill University and the University of Montreal on August 19-29, 1959. The first circular will be issued early in 1958. Further information from the Secretary-General, Dr. C. Frankton, Science Service Building, Ottawa, Ontario.

A second international symposium on "Freezing and Drying" will be held under the auspices of the Institute of Biology at the Senate House, University of London, on April 1 and 2, 1958. Further particulars from the General Secretary, 41 Queen's Gate, London, S.W. 7.

A Symposium on the ecology of soil fungi is being organized by Dr. D. Parkinson of the Hartley Botanical Laboratories, The University, Liverpool, to be held on 19, 20, and 21 August, 1958.

Arrangements are well in hand for the second European Mycological Congress to be held in Prague in 1960. More details later.

British Mycological Society

The British Mycological Society has recently made an analysis of papers published in its TRANSACTIONS during three recent years in relation to mycological papers published in six other British journals. This reveals that a 50/50 division between morphology (including taxonomy) and experimental and applied, one fifth of the latter dealing with plant pathology. This appears to be a well balanced distribution which the Council hopes to maintain. The total number of papers published was 124 compared with 118 in the other six journals.

The following officers and members of council for 1958 were elected at the Council General Meeting on 7 December:-

President: F.B. Hora — Vice-President: Dr. Mary Glynne

Treasurer: W. Buddin — Secretary: J.G. Manners (University of Southampton)

Editors: G.C. Ainsworth, S.D. Garrett

Members of Council: J.L. Harley, J.C.F. Hopkins, J. Webster.

Rockefeller Foundation

The Rockefeller Foundation spent over 30 million dollars in 1956. This is a record for any one year, of which nearly 5 m. dollars was for agricultural research, including studies on cereals at I.A.R.I., New Delhi. Altogether 458 fellowships were awarded to 47 countries.

Books of Interest

In the original discussion at the Commonwealth Mycological Conference from which arose the C.P. NEWS it was suggested that one of the functions of that news letter would be notification of books offered for sale or exchange by readers. Little use

has been made of this medium so far for the purpose but on another page of this issue a mart has at last been started.

The AUSTRALIAN JOURNAL OF SCIENCE is to have nine instead of six parts a year and the subscription is to be advanced to £A2 from 25s. The cost per part is therefore unaltered at 4s. 6d.

The eighth edition of the WORLD OF LEARNING was published recently by Europa Publications Ltd., London. It contains xxxii + 1038 pages of concentrated information about every recognized learned society and institution of advanced education, including libraries, in the world, with staff lists. The price of £6 is moderate for such a compilation of facts.

NAME CHANGES IN HERB. I.M.I. DURING 1957

Fungi

Ceratocystis fagacearum (Bretz) Hunt syn. Endoconidiophora fagacearum Bretz; Ceratocystis ulmi (Buisman) Moreau syn. Ceratostomella ulmi Buisman; Cochliobolus miyabeanus (Ito & Kuribay) Drechsler ex Dastur syn. Ophiobolus miyabeanus Ito & Kurib.; Coniella diplodiella (Speg.) Pet. & Syd. syn. Coniothyrium diplodiella (Speg.) Sacc.; Deightoniella torulosa (Syd.) M. B. Ellis syn. Helminthosporium torulosum (Syd.) Ashby; Diplodia maydis (Berk.) Sacc. syn. Diplodia zeae (Schw.) Lév.; Geotrichum candidum Link var. citri-aurantii (Ferrar.) R. Cif. & F. Cif. syn. Oospora citri-aurantii (Ferraris) Sacc. & Syd.; Gloeotinia temulenta (Prill. & Delacr.) Wilson, Noble & Gray syn. Phialea temulenta Prill. & Delacr.; Helminthosporium atrovirens (Harz) Mason & Hughes syn. Spondylocladium atrovirens Harz; Higginsia hiemalis (Higgins) Nannf. syn. Coccomyces hiemalis Higgins; Mycosphaerella melonis (Passer.) Chiu & Walker syn. Mycosphaerella citrullina (C. O. Smith) Grossenb.; Pellicularia koleroga Cooke syn. Corticium koleroga (Cooke) Höhnel; Pezizella oenotherae (Cooke & Ellis) Sacc. syn. Pezizella lythri Shear & Doidge; Phakopsora gossypii (Arth.) Hirats. f. syn. Phakopsora desmium (Berk. & Br.) Cumm.; Physoderma alfalfae (Pat. & Lagerh.) Karling syn. Urophlyctis alfalfae (Lagerh.) Magnus; Pleiochaeta albizziae (Petch) Hughes syn. Ceratophorum albizziae Petch; Pleiochaeta setosa (Kirchn.) Hughes syn. Ceratophorum setosum Kirsch.; Puccinia allii Rudolph syn. Puccinia porri (Sow.) Wint.; Scolecotrichum musae Zimm. syn. Cordana musae (Zimm.) Höhnel; Selenophoma donacis (Pass.) Sprague & C. G. Johnson syn. Septoria oxysporae Penz. & Sacc.; Streptomyces scabies (Thaxt.) Waksm. & Henrici syn. Actinomyces scabies Thaxt.; Transchelia pruni-spinosae (Pers.) Diet. syn. Puccinia pruni-spinosae Pers.; Urocystis agropyri (Preuss) Schroet. syn. U. tritici Kornicke; Verticillium theobromae (Truc.) Mason & Hughes syn. Stachylidium theobromae Turconi.

Bacteria

Pseudomonas rubrilineans (Lee et al.) Stapp syn. Xanthomonas rubrilineans (Lee et al.) Dowson.

LATE NEWS

It has been announced by the Lawes Agricultural Trust that F.C. Bawden F.R.S., head of the plant pathology department, will succeed Sir William Ogg as director of Rothamsted Experimental Station in October next.

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Station, Nelspruit, Transvaal, has been elected a Fellow.

Awards

A Royal Medal of the Royal Society for the current year has been awarded to Prof. F.G. Gregory, professor of plant physiology at the Royal College of Science, London.

The James-Bateman cup for research in fruit growing has been awarded to Dr. A. F. Posnette of East Malling Research Station in recognition of his contribution to horticultural research. This is the first time the cup has been won by a pathologist.

BOOKS FOR SALE

A reader has disposed of his private library with the exception of the following:

Annals of the Missouri Botanical Garden, vols. 9-14 (bound) (1922-27), £15; Annual Reports Quebec Society for the Protection of Plants, 1915-25, £1; Biological Abstracts, vol 1 (1927), £1; Botanical Abstracts, vols. 1-15 (all issued, unbound, index 1-10 bound) 1918-26, £12.10s.; Experiment Station Record, vols. 5-75 and indexes (unbound), £12.10s.; Mycologia, 27 (4), 28 (3), 32 (1-5), 33 (3), £1; Phytopathology, vols. 36-43 (1946-53) (unbound), £20; Proceedings of the Canadian Phytopathological Society, Inaugural and 2nd Session, 1929, 1931, 10s.; Report of the Canadian Plant Disease Survey 16-32 (1936-52) together with Crowell & Lavalee's Check List of Diseases of Economic Plants in Canada, 1942, £2.10s.; Report of N.Y. State Botanist (Peck's Reports) for 1869, 1870 (both bound), unbound for 1879, 1880, 1882, 1889, 1890, 1892, 1897, 1900-1906, 1908, and Plants of North Elba (1899), £10; Scientific Agriculture, vols. 1-10, and 13 (complete), 11, 12, and 14 (several parts missing) (1921-33), £7.10s.; Transactions of the British Mycological Society, vols. 7-40 (1921-57) (7-20 bound as 7 vols. remainder unbound), £75.

Postage extra. Orders or offers to the Director, Commonwealth Mycological Institute, Ferry Lane, Kew, Surrey, England.

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Seedling blight (*Glomerella gossypii*)
Blackarm disease (*Xanthomonas malvacearum*)

WHEAT
Bunt or stinking smut (*Tilletia caries*)

BARLEY
Covered smut (*Ustilago hordei*)
Black loose smut (*Ustilago nigra*)
Leaf stripe (*Helminthosporium gramineum*)
Net blotch (*Helminthosporium teres*)

OATS
Covered smut (*Ustilago killeri*)
Loose smut (*Ustilago avenae*)
Leaf stripe (*Helminthosporium avenae*)

RYE
Bunt (*Tilletia caries*)
Stripe smut (*Urocystis occulta*)

SORGHUM
Loose smut (*Sphacelotheca cruenta*)
Covered smut (*Sphacelotheca sorghi*)

RICE
Footrot (*Gibberella fujikuroi*)
Leaf spot (*Helminthosporium oryzae*)

FLAX
Seedling blight (*Colletotrichum linicola*)
Damping-off (*Fusarium spp.*)

SUGAR-CANE
'Pineapple' disease (*Ceratostomella paradoxa*)

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